

REMARKS

This is in full and timely response to the Office Action mailed February 27, 2003. A petition for a three-month extension of time for responding to the Office Action is being filed herewith. Reexamination and reconsideration are respectfully requested in view of the foregoing amendments and the following remarks.

By the foregoing amendment, claims 1, 5, 6, 24, 27 and 28 have been amended. Claims 1 to 30 remain pending in this application. Of these claims, claims 9 to 30 were withdrawn from consideration by the Examiner as allegedly being drawn to a nonelected invention. However, for reasons stated below, it is respectfully submitted that claims 24 to 30 should be examined along with claims 1 to 8 in this application. Thus, claims 1 to 8 and 24 to 30 are presented in this Amendment for the Examiner's consideration.

Claim 24 has been amended to recite, among other things, an optical lens having the same structure as the optical lens recited in claim 1. Specifically, claim 24 recites such an optical lens in combination with an optical pickup apparatus which also has light emitting and light receiving elements. As amended, claims 1 and 24 are related because they are drawn to a subcombination and combination, respectively, of the Applicants' invention. Claim 24 (the combination claim) includes all of the features of claim 1 (the subcombination claim). Moreover, dependent claims 25 to 30 correspond closely with dependent claims 3 to 8. Accordingly, it is respectfully submitted that a restriction between Group I (claims 1 to 8) and Group IV (claims 24 to 30) is no longer

proper, and that the Group IV claims should be examined forthwith.

On pages 2 to 3 (Section 3) of the Office Action, the Examiner included a form paragraph regarding the proper language and format for an abstract of the disclosure. The Examiner did not state that the Applicants' abstract was informal for any specific reason. However, in reviewing the abstract, it was found to contain more than the recommended range of 50 to 150 words. Accordingly, the abstract has been revised to reduce the number of words from 174 to 144. The abstract is now believed to be in acceptable form for U.S. practice.

Claims 1 to 8 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Borrelli et al. (U.S. Patent No. 4,684,222). The Examiner contends that Borrelli et al. teach all of the features of the claimed invention. To the extent that this rejection might still be applied to claims 1 to 8 as amended, it is respectfully traversed for the following reasons.

Borrelli et al. disclose an anamorphic lens formed in photosensitively crystallizable glass by selective exposure of the glass surface and thermal treatment to cause the crystallization of the glass 14 surrounding the lens 16. The lens 16 has raised curved surfaces on both the upper and lower sides of the glass substrate resulting from the densification of the glass 14 surrounding the raised curved surfaces. The lens 16 exhibits different surface curvatures over its major and minor transverse axes and thus anamorphic light-focusing properties.

As noted above, the lens 16 disclosed in Borrelli et al. has raised curved

surfaces on both the upper and lower sides of the glass substrate (see, e.g., column 5, lines 26 to 27). This is accomplished by using a photosensitively crystallizable glass as the lens substrate, covering the substrate with a mask 10 having lens areas exposed (Fig. 1a), exposing the substrate through the mask to a radiation source (Fig. 1b), and heat-treating the substrate in such a manner that lens areas 16 are formed by densification of the surrounding opaque crystallized glass 14. Borrelli et al. do not teach the use of a mask in combination with a plasma etching process, nor the formation of an optical lens having a flat lower surface and a convex curved upper surface.

In contrast, the Applicants' optical lens has only the upper side of the substrate formed with a convex curved face. The lower side of the substrate of the Applicants' invention has a continuous flat face, as shown, for example, in Figs. 1B, 1D, 2A and 3D. In the Applicants' invention, the optical lens is formed using a mask 30b and a plasma etching process that transfers the shape of the mask layer portions 30b to the upper surface of the substrate 10 to form the convex lens portions 20.

The convex lens portions 20 in the Applicants' invention are formed by plasma etching the mask and the surrounding material, and not by densification of the surrounding material, as in Borrelli et al. Thus, it is possible to form the convex lens portions 20 in the Applicants' invention with a flat lower surface and a convex curved upper surface, instead of the convex upper and lower surfaces that necessarily result from the process of Borrelli et al.

To emphasize these differences between the Applicants' invention and the

teachings of Borrelli et al., claim 1 has been amended to recite an optical lens having the following features:

a substrate made of an optical material which has a continuous flat face on a first side through which an axis in a focus direction of said optical lens passes; and

a convex element formed integrally with said substrate and having a convex curved face that protrudes from a second side of said substrate opposite from said first side so as to have a function as an optical lens.

A corresponding change was also made to the specification in the paragraph beginning at page 6, line 2, to provide antecedent basis in the written description for this claimed feature. Support for this feature of the Applicants' claimed invention is provided, for example, in Figs. 1B, 1D, 2A, and 3D of the Applicants' drawings.

Claim 5 was amended to clarify that the claimed flat face recited in claim 5 is the portion of the substrate surrounding the convex element on the second side of the substrate. Claim 6 was amended to clarify that the claimed groove is formed in the second side of the substrate along a boundary between the flat face on the second side of the substrate and the convex element. Corresponding changes were made to page 7 of the specification to provide antecedent basis for the revised claim language. Support for these features of the Applicants' invention is provided, for example, on page 20, lines 20 to 23, and on page 21, lines 6 to 9, of the Applicants' specification, and in Figs. 1B-1D and 3D of the Applicants' drawings.

As amended, it is respectfully submitted that claim 1 distinguishes over

Borrelli et al. for at least the reason that Borrelli et al. fails to teach or suggest an optical lens having a flat face on one side and a convex curved face on an opposite side.

With regard to claim 6, it is respectfully submitted that Borrelli et al. fail to teach or suggest the claimed groove formed along a boundary between the substrate and the convex element. The Examiner states on page 4 of the Office Action that:

"The optical lens of Borrelli et al. ... will inherently have a groove formed along a boundary between the substrate and said convex element, this being reasonably assumed from Borrelli et al. disclosing the densification and shrinkage of the lens material during development (column 3, lines 17-24)."

However, Borrelli et al. do not teach that such a groove would be formed during the densification and shrinkage of the lens material, and the Applicants respectfully disagree that Borrelli et al. would inherently have such a groove. The crystallization and densification process taught by Borrelli et al. is totally different from the plasma etching process of the Applicants' invention. Therefore, the fact that grooves are formed in the Applicants' optical lens does not suggest that such grooves would also be formed in an optical lens made by Borrelli et al.'s process.

With regard to claims 7 and 8, it is respectfully submitted that since Borrelli et al. fail to teach or suggest the claimed groove recited in claim 6, Borrelli et al. also fail to teach or suggest the particular groove shapes recited in these claims.

Accordingly, it is respectfully submitted that claims 1 to 8 are not anticipated under 35 U.S.C. 102(b) by Borrelli et al. Reconsideration and withdrawal of this rejection are respectfully requested.

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PATENT APPLICATION

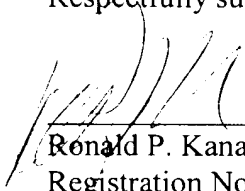
It is respectfully submitted that claims 24 to 30, which are drawn to an optical pickup apparatus having, among other things, an optical lens according to claim 1, are allowable for at least the same reasons explained above regarding claims 1 to 8.

Applicants respectfully submit that claims 1 to 8 and 24 to 30 are now in condition for allowance, and request that a timely Notice of Allowance be issued for this application.

If the Examiner has any comments or suggestions that could place this application into even better form, the Examiner is encouraged to contact the Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted by:

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